ENERGY AND ENVIRONMENT CABINET
DEPARTMENT FOR ENVIRONMENTAL PROTECTION
DIVISION OF WATER
200 FAIR OAKS LANE, 4TH FLOOR
FRANKFORT, KENTUCKY 40601
PHONE (502) 564-3410
FAX (502) 564-0111
www.dep.ky.gov

Leonard K. Peters
Secretary

R. Bruce Scott
Commissioner

Sandra L. Gruzesky
Director

April 3, 2013

Senator Ernie Harris, Co-Chair
Representative Johnny Bell, Co-Chair
c/o Donna Little
Administrative Regulation Review Subcommittee
Legislative Research Commission
029, Capitol Annex
Frankfort KY 40601

Re: 401 KAR 10:031(Amended After Comment). Surface water standards.
Agency Amendment to revise Kentucky water quality standards for selenium

Dear Co-Chairs Harris and Bell:

Following consideration of comments received by the cabinet, including from the U.S. Environmental Protection Agency (U.S. EPA), regarding the cabinet's proposed revision to 401 KAR 10:031 to withdraw the acute water quality criterion for selenium, the cabinet has amended the revisions to proposed Kentucky-specific water quality criteria for selenium. The attached agency amendment to 401 KAR 10:031 (Amended After Comment) incorporates these proposed criteria for selenium.

Kentucky's current acute and chronic water quality criteria for selenium were adopted in 1990. The cabinet's initial proposal to withdraw the acute water quality criterion for selenium was based on the concern that Kentucky's current acute criterion derived from U.S. EPA guidance is not scientifically sound or defensible. The U.S. Court of Appeals for the District of Columbia Circuit had issued an order on September 19, 1996 granting EPA's motion to vacate U.S. EPA's selenium criteria, which are the same criteria that Kentucky currently has in effect. (*American Iron and Steel Institute v. EPA*, D.C. Cir. No. 95-1348 and consolidated cases). In 2004 EPA proposed an update of the acute and chronic criteria for selenium. The acute criterion was to be derived from an equation that accounted for the differential toxicity of selenite and selenate and considered the fractions of selenite and selenate in a water body in calculating the acute toxicity of selenium. EPA proposed replacing the chronic criterion of 5.0 µg/L was with a whole-body tissue criterion for total selenium of 7.91 mg/Kg dry weight. These proposed criteria were

subsequently withdrawn due to objections from some parties, most notably the U.S. Fish and Wildlife Service with regard to the proposed chronic criterion, but remained as a marker that the recommended national criteria for selenium should be updated. U.S. EPA indicates that it continues to work to develop updated criteria for selenium.

The cabinet is also aware of substantial scientific studies of the toxicity of selenium subsequent to the cabinet adopting its current selenium criteria in 1990, and subsequent to the criteria proposed by U.S. EPA in 1996 and 2004. These studies establish that the current acute selenium criterion in Kentucky is out of date with current knowledge and is in need of reconsideration. Some surrounding states and the Ohio River Sanitation Commission (ORSANCO) do not have an acute selenium standard in place (e.g. North Carolina, Georgia, Florida, Missouri, Ohio), or have promulgated acute standards differing significantly from the national recommended criteria, including Indiana (130 µg/L) and Illinois (1000 µg/L). South Carolina has codified the proposed draft national recommended selenium criteria (U.S. EPA, 2004).

In addition, the cabinet has determined that the chronic criterion is sufficient to protect the designated use of warm water aquatic habitat. This determination is supported by significant water quality monitoring data that indicate selenium is not occurring in Kentucky waters at concentrations near Kentucky's current acute selenium criterion. Selenium occurrence in Kentucky waters is generally well below the chronic criterion of 5.0 µg/L with infrequent local excursions slightly above the chronic criterion.

During the public comment period for the proposed amendments to 401 KAR 10:031 the cabinet received several comments supporting the cabinet's proposal to withdraw the acute selenium criterion. The cabinet also received comments encouraging the cabinet to reconsider the current chronic criterion and suggesting that the chronic criterion should be withdrawn, as well. Commenters cited newly developed science establishing that neither the acute nor chronic selenium criteria are consistent with current scientific knowledge about the toxicity of selenium to aquatic species. These comments recommended that the cabinet consider a fish tissue-based criterion to replace the existing chronic criterion.

U.S. EPA Region IV submitted the only comments concerned with the withdrawal of the acute selenium aquatic life criterion. U.S. EPA expressed concern that eliminating the acute criterion could make it difficult for permit writers to incorporate effluent limits in Clean Water Act discharge permits that are protective of designated uses.

U.S. EPA stated in its comments that Kentucky had three options regarding an acute selenium water quality standard. The cabinet could:

1. leave Kentucky's current acute criterion in place and wait for the release of any revisions to U.S. EPA's selenium criteria guidance;
2. adopt the acute criterion from U.S. EPA's current national §304(a) recommended guidance; or
3. adopt an alternate criterion based on other scientifically defensible information.

U.S. EPA recommended that the cabinet keep in effect the current acute criterion and await the

release of any revisions to U.S. EPA's selenium criteria guidance; however, despite that US. EPA withdrew its last attempt at revising the selenium acute criterion national recommended guidance nine (9) years ago (in 2004). U.S. EPA has not indicated a clear path forward or a timeframe for updating the national recommended criteria for selenium.

In its November 14, 2012 Statement of Consideration (SOC) of comments on its proposed amendments to 401 KAR 10:031 regarding selenium, the cabinet left open the possibility of adopting the current national recommended acute criterion, or, alternatively, developing a state-specific criterion based on other scientifically defensible information, as suggested by U.S. EPA in their comments. The cabinet subsequently conducted an exhaustive survey of recent studies of selenium toxicity to aquatic species. Based on this survey and on its assessment of the data, the cabinet determined that indeed it is appropriate for Kentucky to develop state-specific water quality criteria for selenium based on current, scientific information. This action is responsive to the public comments received, in particular U.S. EPA's recommended option to "adopt an alternate criteria (*sic*) based on other scientifically defensible information."

This proposed action by the cabinet is also consistent with federal and state law that give states the authority to establish water quality standards. The Clean Water Act §101(b) declares that it is the policy of the Congress to recognize, preserve, and protect the primary responsibilities and rights of states to prevent, reduce, and eliminate pollution. The Clean Water Act and implementing regulations make clear that it is the states that have primary authority to establish, review and revise water quality standards for intrastate waters, and that states have the authority to propose state-specific water quality criteria. 40 CFR § 131.11 (a)(2)(b) encourages states to establish numerical criteria based on: §304(a) Guidance [national recommended water quality criteria], §304(a) Guidance modified to reflect site-specific conditions, or other scientifically defensible methods.

In fact, U.S. EPA has recently specifically acknowledged that it is the state's role to promulgate water quality criteria and that U.S. EPA's role is to review these criteria and the basis for the criteria to ensure scientific soundness. *Gulf Restoration Network, et al v. U.S. EPA, et al.* Case No. 12-cv-677-JCZ-DEK (E.D.La.), Document 141-2 Defendants' Combined Memorandum In Support of EPA's Motion to Dismiss or In The Alternative For Summary Judgment and In Opposition To Plaintiffs' Motion for Summary Judgment, filed January 18, 2013

40 CFR § 131.11 (a)(1) requires that states adopt water quality criteria that protect the designated uses of state water bodies. 40 CFR § 131.11 (a)(2) requires where toxic pollutants are at a level to warrant concern states must adopt criteria for such toxics applicable to the water body sufficient to protect the designated use.

Kentucky law clearly authorizes the cabinet to propose state-specific water quality criteria. KRS 224.10-100 provides the Cabinet the authority, power, and duty to: . . .

> (4) Develop and conduct a comprehensive program for the management of water, land, and air resources to assure their protection and balance utilization consistent with the environmental policy of the Commonwealth;
> (5) Provide for the prevention, abatement, and control of all water, land, and air pollution . . .

> (25) Perform other acts necessary to carry out the duties and responsibilities described in this section . . .
> (28) Promulgate administrative regulations not inconsistent with the provisions of law administered by the cabinet.

Consistent with this authority, 401 KAR 10:029 Section 1(1) states:

> "[t]he purpose of 401 KAR 10:026 through 401 KAR 10:031 is to safeguard the surface waters of the commonwealth for their designated uses, to prevent the creation of new pollution of these waters, and to abate existing pollution.

Current findings show the primary mode of chronic toxicity effects on fishes is based on dietary uptake rather than water column concentration. These whole body and egg/ovary criteria are based on fish-tissue concentrations of total selenium and presented in the attached Kentucky Division of Water document entitled "Update to Kentucky Water Quality Standards for Protection of Aquatic Life: Acute Selenium Criterion and Tissue-Based Selenium Chronic Criteria", dated February 5, 2013. The cabinet-derived proposed chronic criteria are based on exposure of fishes to selenium through diet. The cabinet considered, and as appropriate, incorporated those studies with chronic data derived from taxa native to Kentucky, and those taxa that have been introduced or could serve as surrogate taxa to native species. All species but the white sturgeon (*Acipenser transmontanus*) and northern pike (*Esox lucious*) are either native or naturalized to the commonwealth's aquatic habitats. The white sturgeon served as a surrogate to native species of sturgeon and northern pike for muskie (Esox *masquinongy*).

The chronic effects endpoint was based on the effects concentration for 10% of the study population (EC_{10}) for selenium (*cf.* EPA used EC_{20}, which is less conservative). The criteria developed meet the requirements of the *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and their Uses* (Stephan et al. 1985)

In developing Kentucky-specific chronic criteria, the cabinet reviewed the studies and data published in the 2004 U.S. EPA draft selenium criteria document, and additional data published since the 2004 draft. The cabinet's proposed chronic criteria are based on exposure of fishes to selenium through diet. The cabinet considered, and as appropriate, incorporated the results of those studies with chronic data derived from taxa native to Kentucky, or taxa that have been introduced and are naturalized to Kentucky or that could serve as surrogate taxa to native species. All species but the white sturgeon (*Acipenser transmontanus*) and northern pike (*Esox lucious*) are either native or naturalized to the commonwealth's aquatic habitats. The white sturgeon served as a surrogate to native species of sturgeon and northern pike for muskie (Esox *masquinongy*). The cabinet is proposing tissue-based chronic criteria for selenium adopting the option to assess whole-body fish tissue or, alternatively, of fish egg/ovary tissue.

The current U.S. EPA national recommended acute total selenium criterion is based on an equation that accounts for the percent fractions of selenite and selenate in a water body, updating a previous national recommended criterion (20 µg Se/L) that was based only on total selenium. In addition, since the current national U.S. EPA criterion accounting for fractions of selenite and selenate was recommended, the U.S. EPA proposed in 2004 that the presence of sulfate in the

water column modifies or attenuates the acute toxic effects of selenate. The cabinet is proposing a revised acute criterion for selenium consistent with the EPA (2004) proposed criteria, with the partial addition of a sulfate-effect modifier.

The proposed Kentucky Water Quality Acute Criterion for Warm Water Aquatic Habitat for Selenium is 258 µg/L[1].

[1]If the concentration of sulfate is less than forty-four (44) mg/L, the alternate acute water quality standard for selenium may be obtained by calculating the Criterion Maximum Concentration (CMC) using the concentrations of selenite and selenate as follows: CMC = 1/[f1/CMC1) + (f2/CMC2)], where CMC1 is 258 µg/L for selenite and CMC2 is e(0.5812[ln (sulfate)] + 3.357) µg/L for selenate, and f1 is the fraction of total selenium that is selenite and f2 is the fraction of total selenium that is selenate.

The proposed Kentucky Water Quality Chronic Criteria for Warm Water Aquatic Habitat for Selenium* is 8.6 µg/g[2,3] or 19.2 µg/g[4].

[2] This value is the concentration in µg/g (dry weight) of whole fish tissue.

[3] A concentration of 5.0 µg/L or greater selenium in the water column shall trigger further sampling and analysis of whole-body fish tissue or alternately of fish egg/ovary tissue.

[4] This value is the concentration in µg/g (dry weight) of fish egg/ovary tissue.

*These proposed values are derived based on species native or naturalized to Kentucky waters or which serve as appropriate surrogates to native fish species.

The chronic criteria will be implemented via a threshold water column concentration of 5.0 µg Se/L. The cabinet has determined that using the current Kentucky chronic criterion and recommended national criterion as a water-column translator threshold is appropriate. The 5.0 µg Se/L is the current Kentucky and U.S.EPA water quality standard for selenium and is currently used in the assessments of waterbodies for compliance with use designation and may be used as a compliance limit in §402 discharge permits. If the water column concentration exceeds 5.0 µg Se/L then fish tissue shall be collected and analyzed for total selenium residue on a dry weight basis, as follows:

Step 1. Determine whether the water column concentration of total selenium at the site exceeds the 5.0 µg/L threshold.

- If the water column concentration for total selenium is ≤5.0 µg/L the water body is meeting its aquatic life use.

- If the water column concentration for total selenium is >5.0 µg Se/L proceed to Step 2.

Step 2. Determine whether the site is in attainment of the tissue criterion (whole body [8.6 µg/g total selenium dry weight] or egg/ovary tissue [19.3 µg/g total selenium dry weight]).

- If each species-composite fish tissue has a selenium concentration less than the appropriate tissue-based criterion, the water body is meeting the chronic standard for selenium.

- If a species-composite fish tissue has a selenium concentration that exceeds the tissue criterion the site is considered in non-attainment of the water quality standard.

The cabinet has determined that the Kentucky amended water quality criteria for selenium protect the designated use of warm water aquatic habitat in Kentucky water bodies and therefore complies with both federal and state law, as previously discussed.

The cabinet first submitted the attached agency amendment to LRC on February 5, 2013 along with a technical document describing the procedures the cabinet used in developing the proposed water quality criteria for selenium. On the same day, February 5, 2013, this same material was sent to persons who had commented on the regulation, was posted on the Department for Environmental Protection blog website and was also sent electronically or by regular mail to persons who had registered with the Cabinet pursuant to KRS 13A.270(3). The distribution included notice of the February 11, 2013 ARRS meeting and specifically noted that the public may be heard on the amendments at the Subcommittee hearing. As a result of the agency notification, some comments were received by the agency from interested parties on or prior to February 11, 2013, including several dozen phone calls received by the agency.

The cabinet presented the amendment to the ARRS subcommittee on February 11, 2013. At that public meeting several environmental groups prominent and active in Kentucky were heard regarding the proposed amendment. In response to their comments, the cabinet voluntarily elected to defer consideration of 401 KAR 10:031 Amended After Comment by the ARRS subcommittee until the next ARRS meeting in order to provide additional time for interested parties to evaluate the proposed agency amendment and provide the cabinet their comments on the amendment. On the next day, February 12, 2013, the Cabinet issued a press release describing the proposed changes to the selenium criteria, the Cabinet's rationale for the proposal and the scientific analyses supporting the proposed new criteria. The press release also included an invitation for those interested to submit comments on the proposed criteria to the Division of Water through March 1, 2013 and instructions on how to do so. In addition, on February 14, 2013 the Cabinet notified a number of interested stakeholder groups that the Cabinet would hold two additional meetings at which they would again be heard and ask questions regarding the proposed amendments.

The stakeholder meetings were held on February 22 and February 26, 2013 at the Department of Environmental Protection office in Frankfort. Both meetings were attended by Cabinet personnel who could respond to questions, including the Commissioner for the Department of Environmental Protection, the Director and Assistant Director of the Division of Water, technical staff, including the author of the technical document, and other Cabinet staff. Those in attendance and participating by phone included several representatives of multiple environmental organizations that commented at the February 11 ARRS meeting, federal stakeholders including U.S Fish and Wildlife Service and EPA Region 4, and representatives of business and

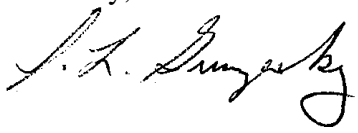
commercial stakeholders, and the media. All persons who wished to speak, present information, or ask questions at these meetings had the opportunity to do so. The meetings convened at 10:00 am and 1:00 pm on February 22 and February 26, 2013, respectively, and continued for as long as people wished to speak or ask questions.

On March 8, 2013 in order to more fully consider the comments made at the February 22 and 26 stakeholder meetings as well as written comments submitted by stakeholders and other members of the public on the proposed selenium amendment, the Cabinet deferred the regulations from the March 2013 ARRS hearing on the proposed selenium criteria to the April, 2013 ARRS meeting. The cabinet developed a Statement of Consideration (attached) of comments received during the advertised comment period.

The cabinet's administrative procedures to amend the water quality criteria for selenium comply with both the Clean Water Act and its implementing regulations, and with state law (KRS Chapter 13A).

Thank you for your consideration of this agency amendment. If you have any questions or need additional information, please contact Peter Goodmann at (502) 564-3410 or at Peter.Goodmann@ky.gov.

Sincerely,



Sandy Gruzesky, Director
Division of Water

Attachments: Agency Amendment (proposed)
Final Selenium Criteria Technical Document
Statement of Consideration of Comments received by the cabinet

Agency Amendment

ENERGY AND ENVIRONMENT CABINET
Department for Environmental Protection

401 KAR 10:031. Surface water standards.

Page 16
Table 1, Selenium Row
Warm Water Aquatic Habitat, Column: Acute

Insert "258[9]" before "[~~20~~]".

Page 16
Table 1, Selenium Row
Warm Water Aquatic Habitat, Column: Chronic

Insert the following, including the hard return after the first set of numbers:

8.6[10, 11]
19.3[12]

Delete "5.0".

Page 20
Table 1, Footnote 8
Line 5

After "be adversely affected.", insert the following:

[9]If the concentration of sulfate is less than forty-four (44) mg/L, the alternate acute water quality standard for selenium may be obtained by calculating the Criterion Maximum Concentration (CMC) using the concentrations of selenite and selenate as follows:

CMC = 1/[(f1/CMC1) + (f2/CMC2)], where CMC1 is 258 µg/L for selenite and CMC2 is $e^{(0.5812[\ln(\text{sulfate})] + 3.357)}$µg/L for selenate, and f1 is the fraction of total selenium that is selenite and f2 is the fraction of total selenium that is selenate.

[10]This value is the concentration in µg/g (dry weight) of whole fish tissue.

[11]A concentration of five and zero tenths (5.0) µg/L or greater selenium in the water column shall trigger further sampling and analysis of whole-body fish tissue or alternately of fish egg/ovary tissue.

[12] This value is the concentration in µg/g (dry weight) of fish egg/ovary tissue.